Activity: Organizing the Periodic Table

FOR THE TEACHER

Summary
In this activity, students are challenged to organize elements into the shape of the periodic table based on trends in data. Students are given a set of cards, each card representing an element, and containing five data points for consideration. The data that students will analyze includes atomic mass, atomic radius, melting point, density and electronegativity.

Grade Level
High School and Middle School

NGSS Alignment
This activity will help prepare your students to meet the performance expectations in the following standards:

- Scientific and Engineering Practices:
  - Analyzing and Interpreting Data
  - Obtaining, Evaluating, and Communicating Information

Objectives
By the end of this activity, students should be able to

- Identify trends of the periodic table, including atomic mass, atomic radius, density, electronegativity and melting point.
- Recognize many of the elements on the periodic table.
- Predict the location of an unknown element on the periodic table based on given data.

Chemistry Topics
This activity supports students’ understanding of

- Periodic Tables
- Elements
- Periodic Trends
- Atomic Mass
- Atomic Radius
- Density
- Electronegativity
- Melting Point

Time
Teacher Preparation: 15-20 minutes
Lesson: 30 minutes

Materials
- Periodic Table Activity Cards: 1 set per group
- Game Board (optional—see Teacher Notes)

Safety
- No specific safety precautions need to be observed for this activity.

Teacher Notes
- This teaching resource was created by ACS Education staff in celebration of IYPT, with a special thanks to the University of Puerto Rico Aguadilla Student Chapter of the American Chemical
Society. The illustrations on the activity cards were created in 2015 by student members of the ACS ChemClubs.

- The activity cards also include the Spanish name of each element.
- In preparation for this classroom activity, teachers should make copies of the activity cards for student use. One set of cards requires 12 pieces of paper, printed double-sided. Note that when printing, select “print actual size” rather than “fit to page” so that the borders of the cards will line up on both sides of the page for easy cutting.
- One set of cards should be cut out and given to each small group (3-4 students). Alternatively, depending on time, teachers may like to give out a smaller number of cards to each group rather than all 118.
- The sets of activity cards are reusable, so once a teacher creates several sets, they can use them amongst all their classes/sections.
- Activity Directions:
  - The activity cards are given to students, and students should be directed to only look at the side of the card that contains data (atomic mass, atomic radius, melting point, density and electronegativity).
  - Teachers may choose to use a game board for this activity (create a blank periodic table outline on white board or large print paper). Alternatively, the teacher could display an outline of a blank periodic table for students to reference the arrangement that they are attempting to recreate. See outline below.

![Periodic Table Outline](image)

  - Students should work together to analyze the data and begin organizing their element cards into the shape of the periodic table. It is important that students do not flip any cards over to reveal the identity of the element!
  - Depending on the number of cards given to a group of students, they may be attempting to recreate the entire periodic table, or they may be trying to place a selection of elements properly on the periodic table.
  - After the students are satisfied with the placement of their elements, they should flip the cards over to reveal the identity of each one. Then, they should compare their placement of each element with its actual location on the periodic table.
- Video instructions/student demonstration for this activity is available in both English and Spanish.
- For more information about this teaching resource, and other materials for use with IYPT please visit the ACS webpage celebrating IYPT.
- For many more classroom resources related to teaching the periodic table, please see the Periodic Table Unit Plan developed by AACT.